

SIX NEW SPECIES OF *HEDYOTIS* L. (RUBIACEAE) FROM NORTHERN AUSTRALIA

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Summary

Hedyotis argillacea, *H. largiflorens*, *H. leptocaulis*, *H. laceyi*, *H. thysanota* and *H. delicata* are described as new, and their distribution and relationship to allied species occurring in Australia are discussed.

Introduction

In the course of investigations into the delimitation of the two closely related genera *Hedyotis* L. and *Oldenlandia* L. in Australia, it has become apparent that there are a number of undescribed taxa in them. This is a preliminary paper to formalise names for six taxa to be used in my forthcoming revision of the genera in Australia. The taxa have been described under *Hedyotis* L. which is the correct name for these genera when combined (Merrill & Metcalf 1942).

Herbarium material from BRI, CANB, DNA, MEL, NSW, NT and PERTH has been examined. All measurements have been taken from dried and spirit material except for *H. leptocaulis* where dried and reconstituted material was used. Floral and fruit measurements were made using a Wild binocular microscope fitted with a Wild MMS 235 Digital Length Measuring Unit. Note: NT specimens are now incorporated in DNA.

Hedyotis argillacea Halford, **sp. nov.** affinis *H. coerulescentis* F. Muell. sed capsulis ellipsoido-obconicis rostro obtuso-retuso praeditis et seminibus depresso-ellipsoideis diagnoscenda. *H. coerulescens* capsulis oblongo-ellipsoideis rostro retuso-truncato et seminibus dorsiventraliter complanatis praeditur. **Typus:** Northern Territory. DARWIN AND GULF DISTRICT: 6 km NE of Cape Crawford Roadhouse towards Borroloola, 16°38'S, 135°46'E, 30 April 1989, *D. Halford* H93 (holo: BRI; iso: DNA, K, PERTH).

Slender erect, ascending or diffuse annual herb up to 40 cm tall, branches often sprawling at maturity. Stems terete or obtusely 4-angled, glabrous or with short erect hairs, usually scabridulous on ribs. Leaves opposite; basal leaves subsessile, elliptic to ovate, 5-10 mm long, 3-5 mm wide, often disappearing before plant matures; cauline leaves sessile, linear to narrowly obovate, 1.5-5 cm long, 1-2.5 mm wide, attenuate at apex and base, glabrous or with minute scabrous hairs above and on midrib below, glabrous below, with midrib prominent below. Stipules fused and adnate to the leaf bases; stipule-sheath 0.5-1 mm long, glabrous, produced into triangular lobe, margin sometimes fimbriate. Inflorescences lax, terminal monochasial or dichasial cymes with leaf-like bracts decreasing in size towards apex. Flowers in pairs at nodes sometimes solitary. Pedicels terete, 5-20 mm long. Calyx lobes 4, triangular, 0.5-1.0 mm long, slightly keeled, connate at the base, with margin serrulate or entire; sinus between lobes rounded or acute. Corolla pale mauve outside, with lobes white on adaxial surface becoming pale pink with age; tube short, 0.5-1 mm long; lobes 4, linear, 2.5-3.5 mm long, apex acute, geniculate at c. 1/4 of their length from the tube, with a line of hairs on lobes at knee. Filaments c. 0.3 mm long, attached in corolla tube at or just below sinus between lobes; anthers oblong, 0.4-0.7 mm long. Ovary obconical, 2-locular, 1-2 mm long, glabrous. Style c. 0.5 mm long; stigma bifid; lobes c. 0.5 mm long, erect, subulate. Stamens and style exerted from corolla tube but enclosed by lobes, overtopped by ring of hairs. Placenta fleshy, oblong, attached below centre of septum by stout stalk; ovules 30-50/locule. Capsule crustaceous, ellipsoid-obconical, 2.5-5 mm long (including beak), 1.7-3 mm wide, always longer than wide, glabrous or with minute scabrous hairs, laterally compressed, furrowed along dissepiment; beak short, obtuse-retuse, 0.8-1 mm long, splitting loculicidally, secondary splitting septocidally, beak enclosed by persistent calyx lobes. Seeds numerous, depressed ellipsoid-ovoid, c. 0.7 mm wide; testa brown, reticulate. **Figs 1 & 4A.**

Selected specimens: Western Australia. GARDNER DISTRICT: Cotton fields, Kununurra, May 1967, *Scrymgeour* 1710 (PERTH); 1 km E of grid, 15 km S junction of old road & Victoria Hwy, Jul 1978, *Andrew* 144 (DNA). Northern Territory. DARWIN AND GULF DISTRICT: 6 km NE of Cape Crawford Roadhouse towards Borroloola, Apr 1989, 16°38'S, 135°46'E, *Halford* H93 (BRI). VICTORIA RIVER DISTRICT: 37 km E of W.A./N.T. border along Victoria Hwy, Newry Station, 16°03'S, 129°17'E, Apr 1989, *Halford* H59 (BRI); 40 km W of Supplejack [Supplejack] Homestead, 19°18'S, 129°36'E, Sep 1978, *Latz* 8129A (NT); Timber Creek, 15°37'S, 130°27'E, Jul 1977, *Parker* 1077 (BRI,NT). BARKLY TABLELAND DISTRICT: 28 km N Connell's Bore, 18°43'S, 136°27'E, Jun 1982, *Latz* 9571 (NT); 3 km W of IB Bore, Benmara Station, 17°55'S, 136°52'E, May 1984, *Strong* 139 (NT). Queensland. BURKE DISTRICT: 13 km W of Gregory Downs Homestead towards Lawn Hill, 18°38'S, 139°07'E, May 1989, *Halford* H100 (BRI). NORTH KENNEDY DISTRICT: 126 km towards Lynd Junction from Mt Garnet along Kennedy Development road, 18°41'S, 144°44'E, May 1989, *Halford* H126 (BRI); Low Holm, NW of Pentland, 20°06'S, 145°59'E, Jul 1954, *Blake* 19365 (BRI). (14 specimens examined).

Distribution and habitat: Recorded across northern Australia from Kununurra, Western Australia, to Mt Garnet, Queensland (**Map 1**). It is found on clay soils, rarely on sandy soils, in grasslands, herblands and open woodlands, also around moist depressions on road verges and irrigated fields. Has once been collected on a rocky platform in a watercourse.

Relationships: It is closely related to and resembles *H. coerulescens* F. Muell., from which it may be distinguished by its ellipsoid-obconical capsules with obtuse-retuse beak and depressed ellipsoid-ovoid seeds (**Fig. 4A**). In *H. coerulescens* the capsules are obloid-ellipsoid with retuse-truncate beaks and dorsiventrally flattened seeds with a hilar ridge (**Fig. 4B**).

Conservation status: *H. argillacea* is widely distributed but is not known to occur in any conservation reserves. Although its habitat is used for grazing of domestic stock it is not presently considered endangered or threatened.

Notes: *H. argillacea* resembles the Indian *H. graminifolia* L.f. in capsule shape and habit. Further studies may reveal it to be better considered as an infraspecific taxon.

Etymology: The specific epithet refers to the clay soils in which this species commonly grows.

Hedyotis largiflorens Halford, **sp. nov.** maxime similis *H. laceyi* et *H. leptocauli* sed ab amobus statura elatiore et floribus majoribus, corollis eis hujus usque duplo longioribus; a speciebus ceteris Australianis capsulis globosis calycis lobis persistentibus erectis ad apicem ornatis differt. **Typus:** Northern Territory. DARWIN AND GULF DISTRICT: Edith Falls, 33 km N of Katherine, 14°06'S, 132°12'E, 28 April 1989, *D. Halford* H75 (holo: BRI; iso: DNA,K,PERTH).

Annual erect or ascending herb up to 50 cm tall. Branches pubescent with short erect hairs or glabrous; internodes up to 9 cm long. Leaves opposite; basal leaves not seen; cauline leaves sessile, linear, 3–6 cm long, c. 1 mm wide, attenuate at base, acuminate at apex, sparsely scabridulous above and on midrib below, glabrous below, with margin recurved, with midrib prominent below. Stipules fused and adnate to the leaf bases; stipule-sheath 0.5–1 mm long, tuberculate, produced into lobe, colleters on margin shortly fimbriate. Inflorescences lax, terminal cymes with leaf-like bracts decreasing in size towards apex. Pedicels slender, erect, 10–60 mm long. Calyx lobes 4, triangular, 0.5–1.5 mm long, scabridulous, connate at base, acuminate to acute at apex, margin serrulate; sinus between lobes acute, colleters sometimes present between lobes. Corolla white with mauve stripes running the length of lobes, narrowly infundibular, short erect hairs outside; tube 6–8.5 mm long, glabrous or sparsely hairy inside; lobes 4, ovate, 3–6.5 mm long, pilose towards base inside. Stamens exserted; filaments terete, 0.5–1 mm long; anthers 2–2.3 mm long. Ovary globose, 2-locular, 1–1.5 mm diameter, scabridulous. Style exserted from tube when mature, 6.5–7.5 mm long; stigma bifid; lobes filiform, 2.5–3 mm long, twisted, hairy. Placenta fleshy, peltately attached to septum; ovules 35–50/locule. Capsule crustaceous, globose, 2–3 mm diameter, papillose, persistent calyx lobes erect, on top of capsule; beak slightly raised, rounded. Mature seeds not seen. **Fig. 1.**

Additional specimens examined: Western Australia. GARDNER DISTRICT: Lone Dingo, Mitchell Plateau, 14°35'S, 125°45'E, Jun 1987, *Keighery* 8990 (PERTH); c. 8 km SE of Mitchell River Homestead, 15°10'S, 125°50'E, Jun 1985, *Fryxell* 4745 *et al.* (CANB); Dog leg Swamp, Mitchell Plateau, 14°56'S, 126°00'E, May 1978, *Kenneally* 6718 (DNA). Northern Territory. VICTORIA RIVER DISTRICT: Mount Thymaman, 15°11'S, 130°50'E, Mar 1989, *Leach* 2379 & *Dunlop* (BRI).

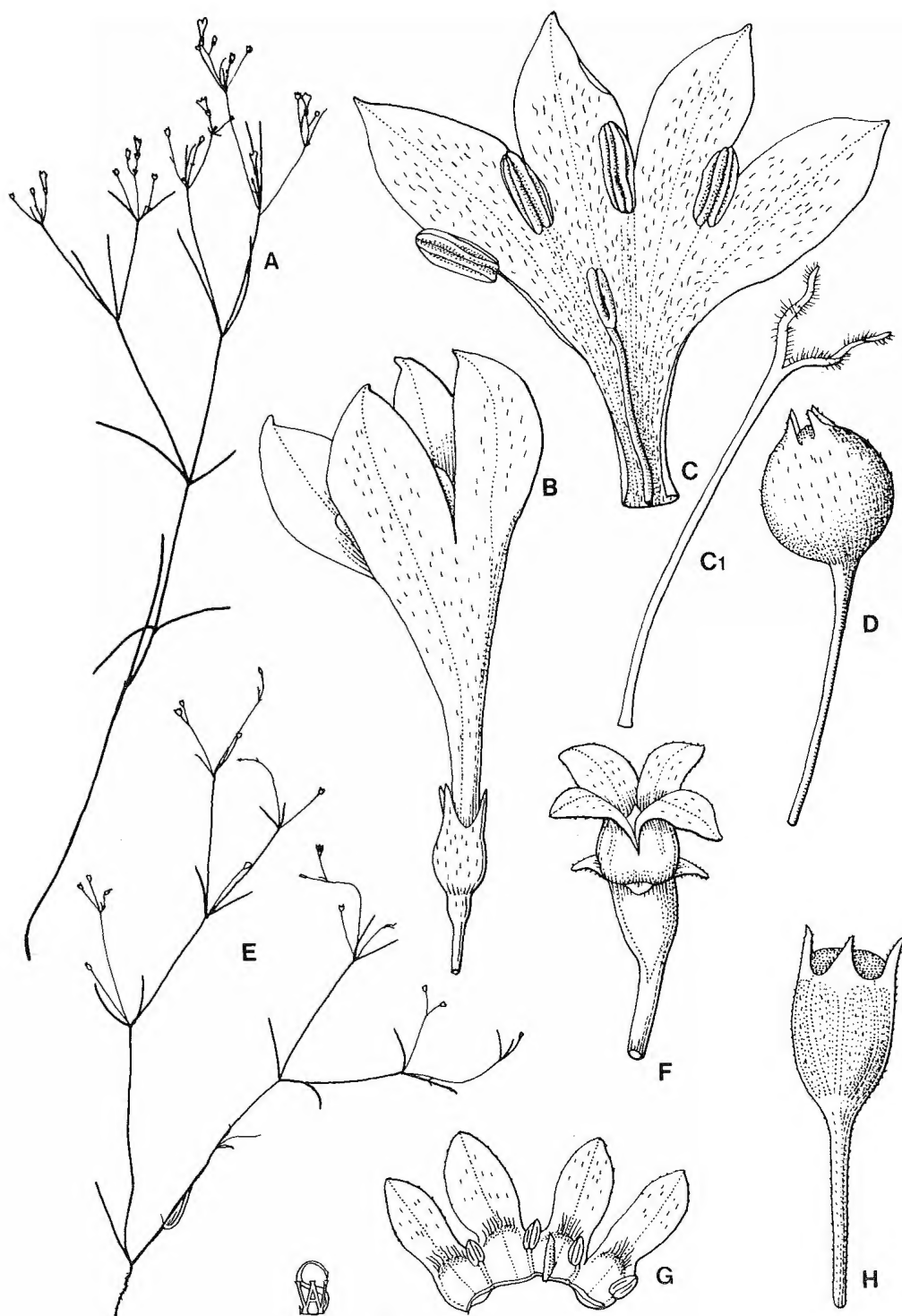


Fig. 1. *Hedyotis largiflorens*: A. habit $\times 0.3$. B. flower $\times 6$. C. corolla opened out, and immature style $\times 6$. C₁. mature style $\times 6$. D. Capsule $\times 6$. *H. argillacea*: E. habit $\times 0.3$. F. flower $\times 6$. G. corolla opened out, and style $\times 6$. H. capsule $\times 6$. A, Keighery 8990; B-D, Halford H75; E, Halford H59; F-H, Halford H126.

Distribution and habitat: *H. largiflorens* is presently known from five populations in the area from the Mitchell Plateau, Western Australia to near Katherine in the Northern Territory (Map 1). Occurs on lateritic loam or sandy soils in *Eucalyptus* woodlands.

Relationships: *H. largiflorens* is most closely allied to *H. laceyi* and *H. leptocaulis* but is readily distinguished from these species by its taller stature and larger flowers; corolla tube 6–8.5 mm long as compared to 1.5–4.5 mm and 4–5.5 mm long respectively. *H. largiflorens* differs from other Australian species of *Hedyotis* in its globose capsule and peltate placenta as well as its larger flowers.

Conservation status: Although fairly widely distributed, this species is only known from five populations. The holotype locality is in Nitmiluk National Park, formerly known as Katherine Gorge National Park. A conservation coding of 3K is appropriate based on criteria of Briggs and Leigh (1988).

Etymology: The specific epithet was chosen to draw attention to the flower size in the species, being the largest flowers of all known Australian species.

Hedyotis leptocaulis Halford, *sp. nov.* accedit *H. laceyi* et *H. largiflorentem*, proxime *H. laceyi*, sed corollis infundibuliformibus, filamentis staminalibus longioribus et calycis lobis longioribus differt; a *H. largiflorenti* statura brevior et floribus parvioribus distinguitur; a speciebus ceteris Australianis (praeter *H. laceyi*) capsulis globosis, placenta peltata et caulibus tenuibus differt. **Typus:** Northern Territory, DARWIN AND GULF DISTRICT: 7.5 km S of Cooina on Pine Creek road, 12°58'S, 132°31'E, 20 May 1980, *M. Lazarides* 8869 (holo: DNA; iso: AD,BRI,CANB, MEL,NSW).

Erect, ascending or diffuse, annual herb. Stems terete, slender, glabrous or pubescent near nodes with short erect hairs. Leaves opposite; basal leaves sessile, linear, 5–8 mm long, c. 0.5 mm wide; cauline leaves sessile, linear, 1.5–2.5(–3.5) cm long, 0.5–1 mm wide, attenuate at apex, glabrous or sparsely covered with short erect hairs above. Stipules fused and adnate to the leaf bases; stipule-sheath c. 0.5 mm long, sparsely covered with erect hairs, produced into lobe c. 0.7 mm long, margin entire or fimbriate. Inflorescences lax, terminal dichasial cymes with leaf-like bracts decreasing in size towards apex. Pedicels capillary, 5–20(–35) mm long. Calyx lobes 4, narrow triangular, 0.5–1.5 mm long, connate at base, margin entire or finely serrulate; sinus between lobes acute. Corolla white, pink to mauve, infundibular; tube 4–5.5 mm long, with scattered short erect hairs outside, glabrous or somewhat hairy inside; lobes 4, ovate, 2–3 mm long, sparsely covered with short glandular hairs inside especially towards base. Stamens exserted; filaments terete, 0.5–1 mm long, erect, reflexed with age; anthers oblong, 0.5–0.8 mm long. Ovary globose, 2-locular, 0.5–1 mm diameter, glabrous or with minute scabrous hairs. Style exserted from tube when mature, 3.5–5 mm long; stigma bifid; lobes filiform, 1.5–2 mm long, twisted, hairy. Placenta fleshy, peltately attached to septum. Capsule crustaceous, globose, 1.5–2 mm diameter, glabrous, persistent calyx lobes erect on capsule; beak slightly raised, rounded, splitting loculicidally. Seeds minute, squat-angular, truncate at apex; testa pale brown, finely reticulate. **Fig. 2.**

Selected specimens: Northern Territory. DARWIN AND GULF DISTRICT: 13 miles [21 km] SE of Darwin, 12°29'S, 131°00'E, May 1958, *Chippendale* 4435 (BRI,NSW,NT); Howard Springs area, 16 miles [26 km] SE of Darwin, 12°27'S, 131°04'E, May 1959, *Chippendale* 6160 (NT); 3.3 km E Humpty Doo Hotel, 12°35'S, 131°07'E, May 1976, *Dunlop* 4254 (DNA); Near Black Jungle, 12°32'S, 131°14'E, Jun 1968, *Wheelright* DW53 (DNA); Baroalba Creek, 10 km ESE of Nourlangie Ranger Station on Pine Creek road, 12°46'S, 132°45'E, May 1980, *Craven* 5494 (BRI,DNA,MEL); Nourlangie Creek, 12°50'S, 132°46'E, Jun 1974, *Fox* 493 (DNA); Koongarra – Hickey creek, 12°51'S, 132°50'E, Jun 1978, *Rice* 2685 (BRI,CANB); Mudginberri Station, 3 km N of homestead, 12°33'S, 132°55'E, May 1981, *Henshall* 3632(NT). (18 specimens examined).

Distribution and habitat: Found on the wetlands east of Darwin to the Arnhem Land escarpment, Northern Territory (Map 2). Occurs on moist sands, and peaty soils in grasslands, sedgelands and open *Melaleuca* woodlands in swamps, seasonally flooded flats and creek beds and banks; also on disturbed swampy soil on roadside.

Relationships: *H. leptocaulis* approaches *H. laceyi* and *H. largiflorens*. It is closest to *H. laceyi* from which it differs in having infundibuliform corollas, longer staminal filaments (0.5–1 mm long) and longer calyx lobes (0.5–1.5 mm long). It can be distinguished from *H. largiflorens* by its shorter stature and smaller flowers. *H. leptocaulis* differs from other

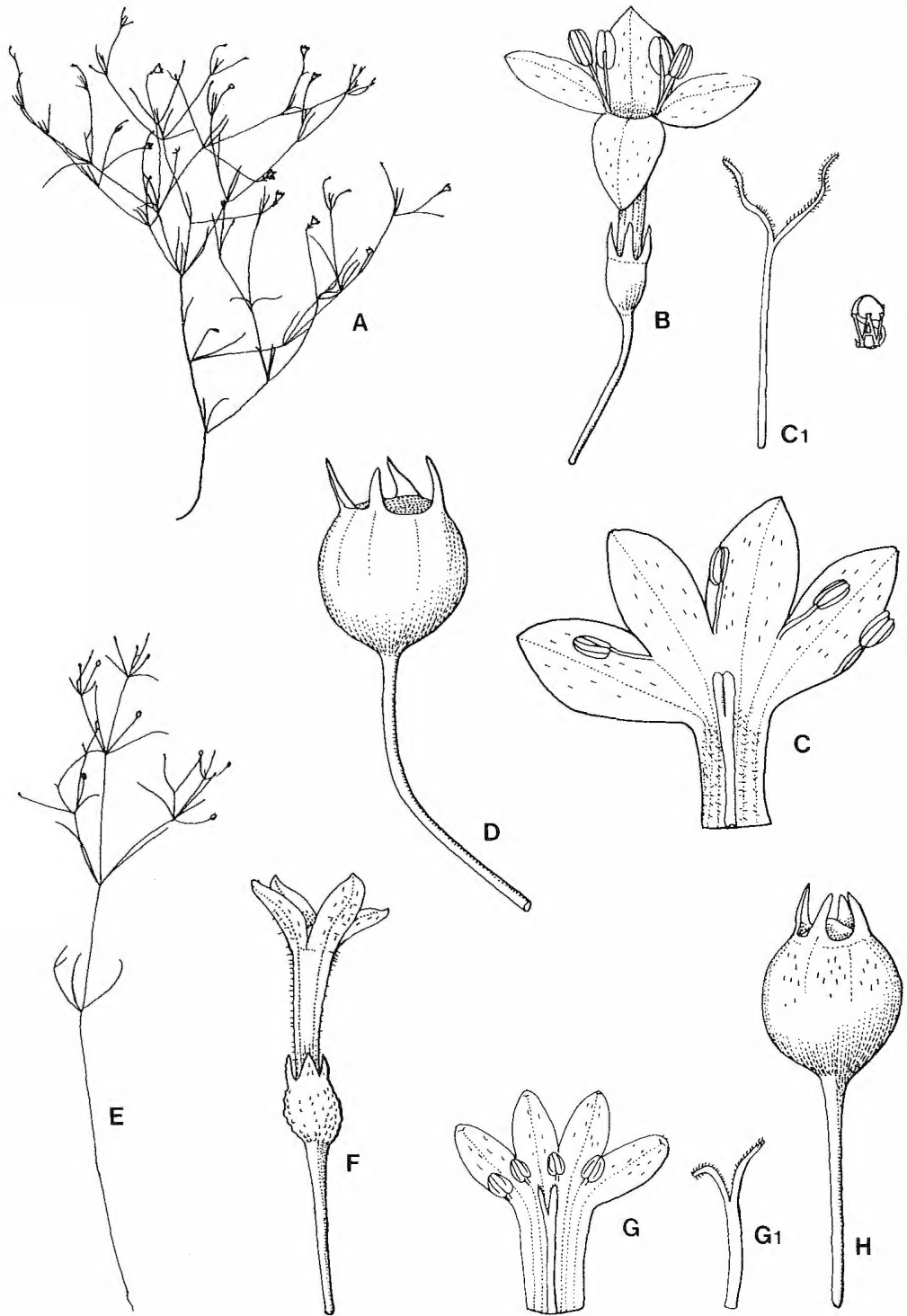


Fig. 2. *Hedyotis leptocaulis*: A. habit $\times 0.3$. B. flower $\times 8$. C. corolla opened out, and immature style $\times 8$. C₁. mature style $\times 8$. D. capsule $\times 8$. *H. laceyi*: E. habit $\times 0.3$. F. flower $\times 8$. G. corolla opened out, and immature style $\times 8$. G₁. mature style $\times 8$. H. capsule $\times 8$. A, Lazarides 8869; B,C,C₁, Craven 5494; D, Dunlop 3613; E,H Halford H120; F, Halford H72; G,G₁, Halford H91.

Australian species of *Hedyotis* by its globose capsule, peltate placenta and its slender stems.

Conservation status: *H. leptocaulis* has a moderately wide distribution and is conserved in Kakadu National Park. However, the majority of known populations are outside conservation reserves and future development of the wetlands east of Darwin may greatly deplete the populations in most of its native range. A conservation coding of 3K is appropriate based on the criteria of Briggs and Leigh (1988).

Etymology: The specific epithet refers to the slender stems of the species.

Notes: The circumscription of *H. leptocaulis* includes the taxon to which Schwarz (1927) applied the name *Oldenlandia tenuissima*. *Oldenlandia tenuissima* Schwarz (1927) is an illegitimate name as it is a later homonym of *O. tenuissima* Hiern (1877). Hiern's name is based on African material which belongs to a completely different taxon from the one described by Schwarz.

Hedyotis laceyi Halford, **sp. nov.** *H. leptocaulis* praesertim habito, capsulis, inflorescentiis seminibusque simulat sed corollis hypocrateriformibus, filamentis staminalibus brevioribus et calyce brevioribus differt; insuper *H. largiflorentem* simulat sed statura brevioribus et floribus parvioribus differt; a speciebus ceteris Australianis (praeter *H. leptocaulis*) capsulis globosis, placenta peltata et caulibus tenuibus differt. **Typus:** Queensland. COOK DISTRICT: Mareeba mining lease, Tinaroo Creek road, c. 15 km SE of Mareeba, 9.6 km off Kennedy Highway, 1 km before Oreiglas Creek crossing, 17°05'S, 145°30'E, 1 May 1972, *I.B. Staples* 010572/11 (holo: BRI; iso: DNA,K,PERTH).

Erect or ascending, annual herb to 30 cm high. Stems terete, slender, glabrous or with scattered tubercles especially at nodes and base when young. Leaves opposite; basal leaves petiolate, c. 1 mm long, elliptic-lanceolate, 4–8 mm long, 1.5–4 mm wide; cauline leaves sessile, linear, 1.0–3.7 cm long, 0.5–1.7 mm wide, attenuate at apex, glabrous or with minute scabrous hairs above and on midrib below, glabrous below, with margin recurved, with midrib prominent below. Stipules fused and adnate to the leaf bases; stipule-sheath c. 0.7 mm long, glabrous or nearly so, produced into triangular lobe, margin entire or fimbriate. Inflorescences lax, terminal dichasial cymes with leaf-like bracts decreasing in size towards apex. Pedicels capillary, 15–27(–35) mm long. Calyx lobes 4, triangular, 0.5–1 mm long, shortly connate at base, with margin entire or minutely serrulate; sinus between lobes acute, collectors usually present between lobes. Corolla white, hypocrateriform, slightly wider at throat; tube 1.5–2.5(–4.5) mm long, sparsely covered with short erect hairs outside, with throat glabrous; lobes 4, elliptic, 1–2(–3.5) mm long, obtuse at apex, uncinately, with scattered hairs on lobes above anthers. Stamens included in the throat or slightly exserted; filaments 0.2–0.5 mm long; anthers oblong, 0.5–1 mm long. Ovary globose, 2-locular, 1–1.5 mm diameter, tuberculate. Style exserted from tube when mature, 2–3 mm long; stigma bifid; lobes filiform, 1–1.5 mm long, twisted, hairy. Placenta fleshy, peltately attached to septum; ovules 40–60/locule. Capsule crustaceous, globose, 2–2.5(–3) mm diameter, glabrous, crowned by a ring of persistent calyx lobes, beakless or nearly so, splitting loculicidally. Seeds minute, squat-angular, truncate at apex; testa reddish brown, reticulate. **Figs 2 & 5C.**

Selected specimens: Western Australia. GARDNER DISTRICT: Lake Argyle road between Dead Horse Springs and Spillway creek turn-off, Jul 1974, *Carr* 3133 & *Beauglehole* 46891 (PERTH). Northern Territory. DARWIN AND GULF DISTRICT: 67 km NE of Pine Creek, Ikoymarrua lookout, 13°31'S, 132°13'E, Apr 1989, *Halford* H72 (BRI); 35 km W of Cape Crawford Roadhouse along Carpentaria Hwy, 16°42'S, 135°23'E, Apr 1989, *Halford* H91 (BRI). VICTORIA RIVER DISTRICT: 35 km E of Kununurra, Keep River N.P., 15°51'S, 129°02'E, Apr 1989, *Halford* H58 (BRI). BARKLY TABLELAND DISTRICT: c. 27 km SW of 'Calvert Hills' on the road to 'Creswell Downs', 17°15'S, 137°10'E, May 1974, *Pullen* 9253 (DNA). Queensland. COOK DISTRICT: Lockerbie, 10 miles [16 km] WSW of Somerset, May 1948, *Brass* 18563 (BRI); 45 km NNW of Cooktown on road to Laura via 'Battle Camp', 15°17'S, 144°51'E, May 1989, *Halford* H120 (BRI); 15 km S of Cooktown on road to Lakefield, 15°35'S, 144°51'E, May 1989, *Halford* H122 (BRI); Near Mareeba, Apr 1967, *Pedley* 2278 (BRI); 4 miles [6 km] W of Mareeba, Apr 1967, *Pedley* 2241 (BRI). BURKE DISTRICT: About halfway between Croydon and "Esmeralda", Jul 1954, *Blake* 19598 (BRI). NORTH KENNEDY DISTRICT: halfway between Townsville and Rollingstone, 19°0'-S, 146°3'-E, Apr 1945, *Blake* 15762 & *Webb* (BRI). (16 specimens examined).

Distribution and habitat: Found across northern Australia from Kununurra, Western Australia to Cape York Peninsula, north-eastern Queensland (**Map 2**). Occurs on shallow gravelly and loam soils and in poorly drained sandy soils in spinifex grasslands and *Melaleuca* and *Eucalyptus* woodlands on dissected hillslopes and rocky screes.

Relationships: *H. laceyi* resembles *H. leptocaulis* especially in habit, capsules, inflorescence and seeds, but differs from it in its hypocrateriform corollas, shorter staminal filaments (0.2–0.5 mm long) and shorter calyx lobes (0.5–1 mm long). In the vegetative state the two species could be confused. *H. laceyi* is similar to *H. largiflorens* but can be easily distinguished by its shorter stature and smaller flowers. *H. laceyi* differs from other Australian *Hedyotis* species by its globose capsule, peltate placenta and its slender stems.

Conservation status: *H. laceyi* is widely distributed and is known to be represented in conservation reserves. It is not considered to be endangered or threatened.

Etymology: Named in honour of Captain H.J. Lacey who worked as a pony express rider in north Queensland and carried the first mail from Cairns to Herberton in 1885.

Notes: The specimens Carr 3133 and Halford H58 have larger flowers and slightly larger capsules than all other specimens. Further material may reveal that these collections should be regarded as a distinct taxon but for the time being they are incorporated under *H. laceyi*.

***Hedyotis thysanota* Halford, sp. nov.** *H. delicatam* simulat sed statura robustiore, inflorescentiis cymosis et ad marginibus loborum corollae pilosus distinguitur; a speciebus ceteris Australianis a caractere ultimo distinguitur. **Typus:** Northern Territory. DARWIN AND GULF DISTRICT: near Koongarra saddle, 1.5 km north of Koongarra, 12°51'S, 132°51'E, 22 May 1980, *M. Lazarides* 8899 (holo: DNA; iso: AD,BRI,CANB,MEL,NSW).

Annual diffuse herb, much branched at base. Branches erect or ascending. Stems slender, terete or slightly ribbed, glabrous. Leaves opposite; basal leaves sessile, linear to obovate, up to 5 mm long, sessile; cauline leaves sessile, linear, 1–2.5 cm long, c. 1 mm wide, narrowing towards base, acute at apex, glabrous, with margin somewhat recurved especially towards base, with midvein prominent below. Stipules fused and adnate to the leaf base; stipule-sheath c. 0.5 mm long, glabrous, produced into single sometimes bifid lobe, with fimbriate margins. Inflorescences 1 or 2 times dichasially branched then monochasial cymes. Bracts small, leaf-like at nodes, up to 7 mm long. Pedicels 2–20 mm long. Flowers paired at nodes of cymes, on unequal pedicels. Calyx lobes 4, linear (somewhat terete), 2–3.5 mm long, connate at base, slightly serrulate at apex; sinus between lobes acute, colleters present between lobes. Corolla pale purple, with veins darker in colour, hypocrateriform; tube 5–7.5 mm long, slightly wider and with ring of soft moniliform hairs at throat; lobes 4, elliptic, 3.5–5.5 mm long, 2–2.5 mm wide; margin of lobes pilose. Stamens exerted; filaments 1.5–2.5 mm long, erect, reflexed with age; anthers linear, c. 1 mm long. Ovary globose, 2-locular, c. 1 mm diameter, papillose. Style exerted from tube when mature, 6.5–8.5 mm long; stigma bifid; lobes filiform, 1.5–2 mm long, twisted, hairy. Placenta fleshy, peltately attached to septum; ovules 10–20/locule. Capsule crustaceous, globose, 1.5–2 mm diameter, sparsely papillose, persistent calyx lobes 2–3.5 mm long; beak slightly raised, rounded, splitting loculicidally. Seeds squat-angular, 0.5 mm across, truncate at apex; testa reticulate, black. **Figs 3 & 5D.**

Selected specimens: Northern Territory. DARWIN AND GULF DISTRICT: Nabarlek area, near water supply dam, 12°20'S, 133°19'E, Apr 1979, *Rankin* 2058 (DNA); c. 30 km NNE of Jabiru, 12°25'S, 132°57'E, Mar 1981, *Craven & Whitbread* 7979 (CANB); c. 362 km E of Darwin between Mudginbarry [Mudginbarri] Station and the East Alligator River, 12°28'S, 132°55'E, Jun 1974, *Pullen* 9434 (CANB); near East Alligator River, 12°2'-S, 132°5'-E, May 1975, *Gittins* 2885 (BRI,NSW); 2 km NNW of Koongarra saddle, 12°45'S, 132°55'E, Apr 1980, *Telford* 8142 & *Wrigley* (CANB); Koongarra jump-up, 12°49'S, 132°55'E, May 1978, *Dunlop* 4850 (DNA); Nourlangie Creek, 12°52'S, 132°47'E, Feb 1973, *Craven* 2451 (DNA,CANB); Waterfall Creek, 0.5 miles above falls, 13°25'S, 132°25'E, Apr 1969, *Byrnes* NB1527 (DNA). (13 specimens examined).

Distribution and habitat: Has been recorded only along the sandstone escarpment of Arnhem Land, Northern Territory (**Map 3**), where it grows on shallow sandy soils over sandstone or sometimes on deep sand in shrublands or open woodlands on moist flats, depressions, hillslopes or on the margins of creeks associated with sandstone rocks.

Relationships: *H. thysanota* resembles *H. delicata* but can be distinguished from it by its stouter habit, cymose inflorescence and pilose margins of the corolla lobes. The latter character distinguishes it from other Australian *Hedyotis* species.

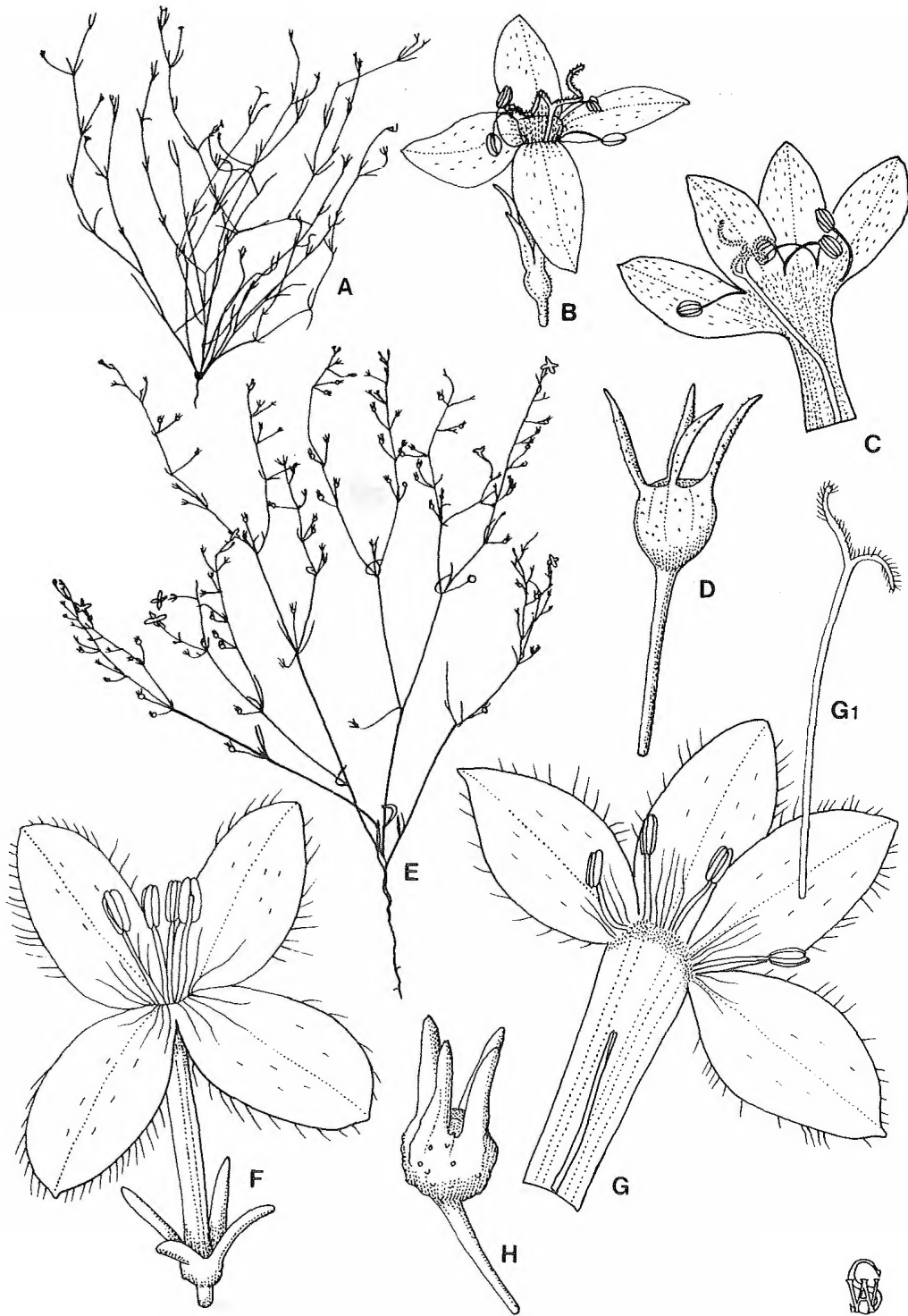


Fig. 3. *Hedyotis delicata*: A. habit $\times 0.3$. B. flower $\times 6$. C. corolla opened out, and style $\times 6$. D. capsule $\times 6$. *H. thysanota*: E. habit $\times 0.3$. F. flower $\times 6$. G. corolla opened out, and immature style $\times 6$. G₁, mature style $\times 6$. H capsule $\times 6$. A-D, Halford H54; E-H, Halford H70.

Conservation status: Although it is relatively restricted in its distribution the majority of known populations are in Kakadu National Park. A conservation coding of 3R is therefore appropriate based on the criteria of Briggs and Leigh (1988).

Etymology: The specific epithet refers to the fringe of hairs on the margin of the corolla lobes.

Hedyotis delicata Halford, *sp. nov.* a speciebus ceteris Australianis, quamquam semina matura non visa, facile distinguitur; *H. thysanotam* morphologia florali simulat sed floribus solitariis axillaribus, ad marginibus loborum corollae pilosis carentibus et pilis retrorsis in caulibus foliisque praedita differt; *H. galoidem* habitu et floribus solitarii axillaribus simulat sed corollis parvis tubularibus et capsulis ovoideo-globularibus dissepimento sulcato praeditis distinguitur. **Typus:** Western Australia. GARDNER DISTRICT: 28 km S of Kununurra, east bank of spillway creek next to bridge on road to Ord Dam, 16°01'S, 128°47'E, 20 April 1989, *D. Halford* H54 (holo: BRI; iso: DNA,K,PERTH).

Slender, weakly ascending, annual herb single or multistemmed from base; branches supported by surrounding vegetation. Stems terete; indumentum retrorsely scabridulous. Leaves opposite; basal leaves petiolate, up to 1 mm long, obovate to elliptic, 2–6 mm long, 1–1.5 mm wide; cauline leaves sessile, linear, 6–20 mm long, up to 1 mm wide, acuminate at apex, scabridulous above and on midrib below, glabrous below, with margin recurved, with midrib prominent below. Stipules fused and adnate to the leaf base; stipule-sheath c. 0.5 mm long, glabrous or with retrorse scabrous hairs, drawn into single entire lobe (sometimes bifid), fimbriate on margin. Flowers solitary in upper leaf axils. Pedicels capillary, 10–30 mm long, retrorsely scabridulous. Calyx lobes 4, narrowly triangular, 1–2.5 mm long, minutely scabridulous, connate at base, acuminate at apex; sinus between lobes acute, colleters sometimes present between lobes. Corolla white, hypocrateriform, scabridulous outside, with ring of hairs at throat; tube 2.5–4.5 mm long, slightly wider at throat; lobes 4, ovate-elliptic, 1.5–3.5 mm long. Stamens exerted from tube; filaments 1–1.5 mm long, erect, reflexed with age; anthers oblong-linear, c. 0.7 mm long. Ovary globose, 2-locular, c. 1 mm diameter, scabridulous. Style exerted from tube when mature, 3.5–5.5 mm long; stigma bifid; lobes filiform, 2–3 mm long, spreading, twisted, hairy. Placenta fleshy, peltately attached to septum; ovules 45–70/locule. Capsule crustaceous, globose, 1.5–2 mm diameter, glabrous or minutely scabridulous, with persistent calyx lobes 1–2.5 mm long; beak slightly raised, rounded. Mature seed not seen. **Fig. 3.**

Additional specimens examined: Western Australia. GARDNER DISTRICT: Aboriginal paintings area, 32 km WSW of Kununurra, Jul 1976, *Beauglehole* 54305 (PERTH); Near spillway, N end of Lake Argyle, Jun 1975, *George* 13171 (PERTH); Kununurra – Timber Creek road, 1.5 km W of Lake Argyle turn-off, Jul 1974, *Carr* 3030 & *Beauglehole* 46809 (MEL,PERTH).

Distribution and habitat: This species is found only in the area between the Northern Territory border and the Great Northern Highway in Western Australia (**Map 3**). This species occurs on seasonally moist sandy soils, in low sedgeland or grasslands on alluvial flats and shallow depressions.

Relationships: Although mature seeds of *H. delicata* have not been seen, this species is quite distinct from the other Australian species. It resembles *H. thysanota* in its flower morphology, but can be easily distinguished by its solitary axillary flowers, the absence of hairs on corolla lobe margins and the presence of retrorse hairs on stems and pedicels. *H. galioides* is similar in habit to *H. delicata* and has solitary axillary flowers but can be distinguished by its small tubular corollas and ovoid-globular capsule.

Conservation status: This species is presently known from four populations which are not in conservation reserves. A conservation coding of 2K is appropriate based on the criteria of Briggs and Leigh (1988).

Etymology: The specific epithet alludes to the overall delicate habit of the species.

Observations: From the examination of herbarium material and observations in the field it is apparent that *H. laceyi*, *H. thysanota*, *H. leptocaulis*, *H. delicata* and *H. largiflorens* all possess protandrous flowers. This has apparently not been reported in the literature in any other Australia species of *Hedyotis*. As the corolla lobes open at flowering the stamens are erect and yellow while the style is short and included well below the corolla

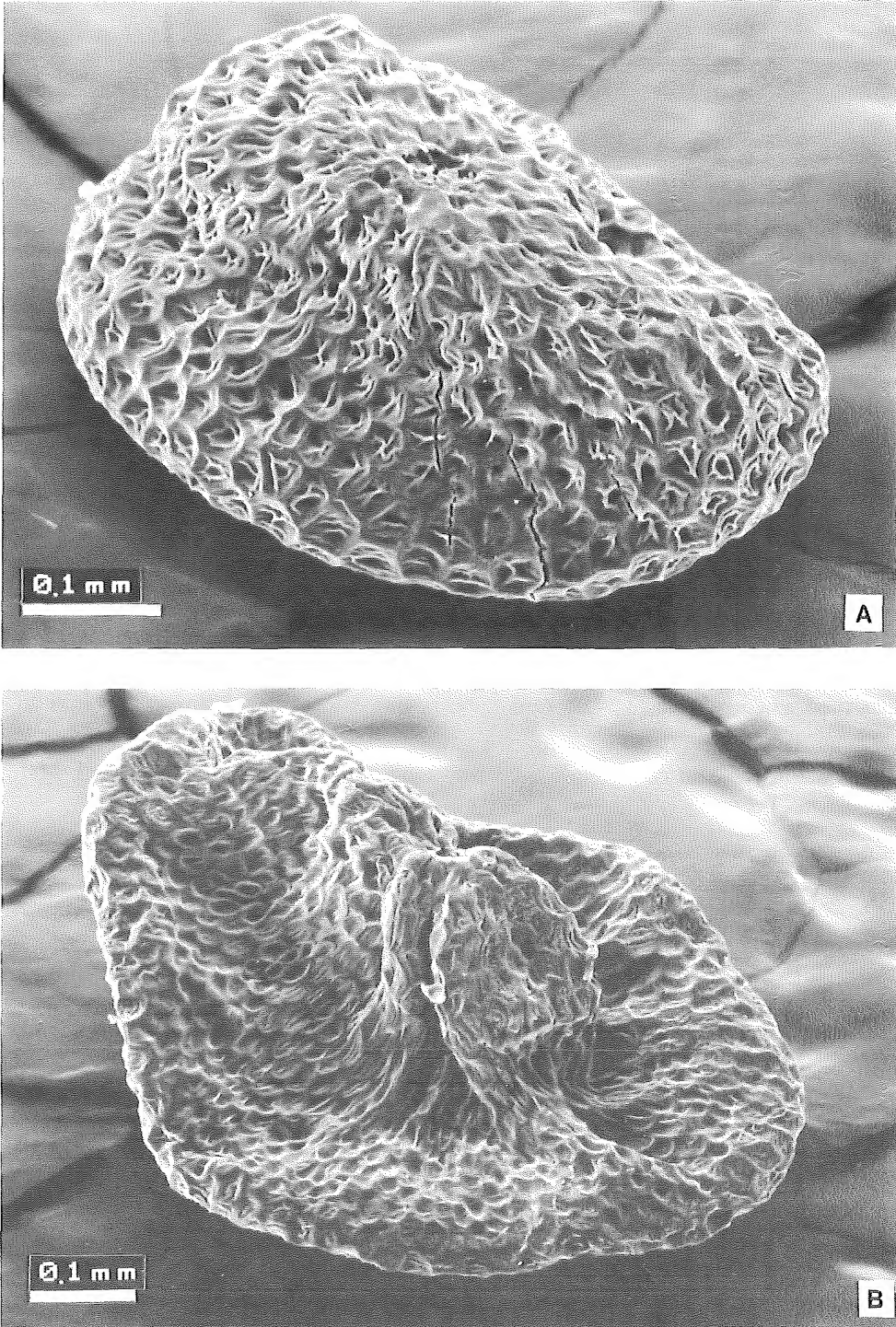


Fig. 4. Scanning electron micrographs of *Hedyotis* seeds mounted with hilum viewed obliquely from the side. A. *H. argillacea*. B. *H. coerulescens*.

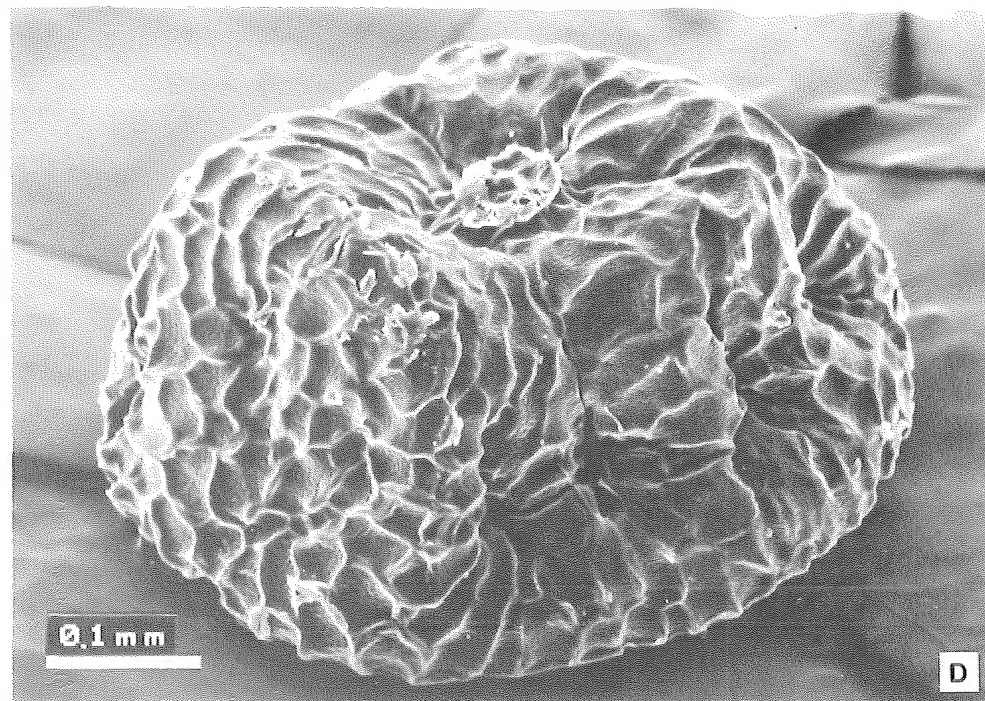
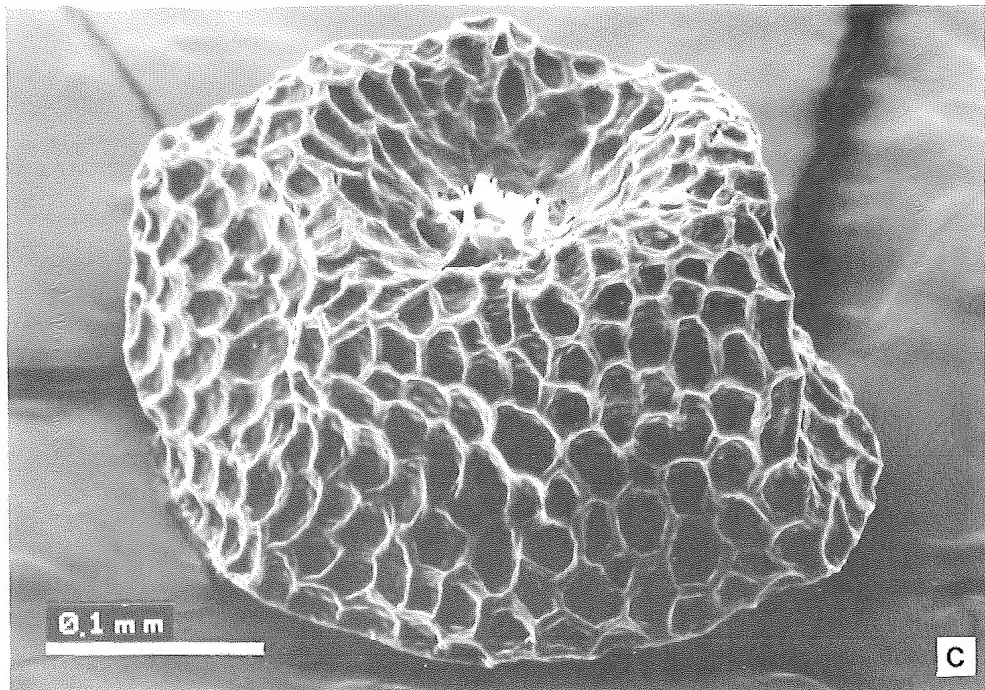


Fig. 5. Scanning electron micrographs of *Hedyotis* seeds mounted with hilum viewed obliquely from the side. C. *H. laceyi* D. *H. thysanota*.

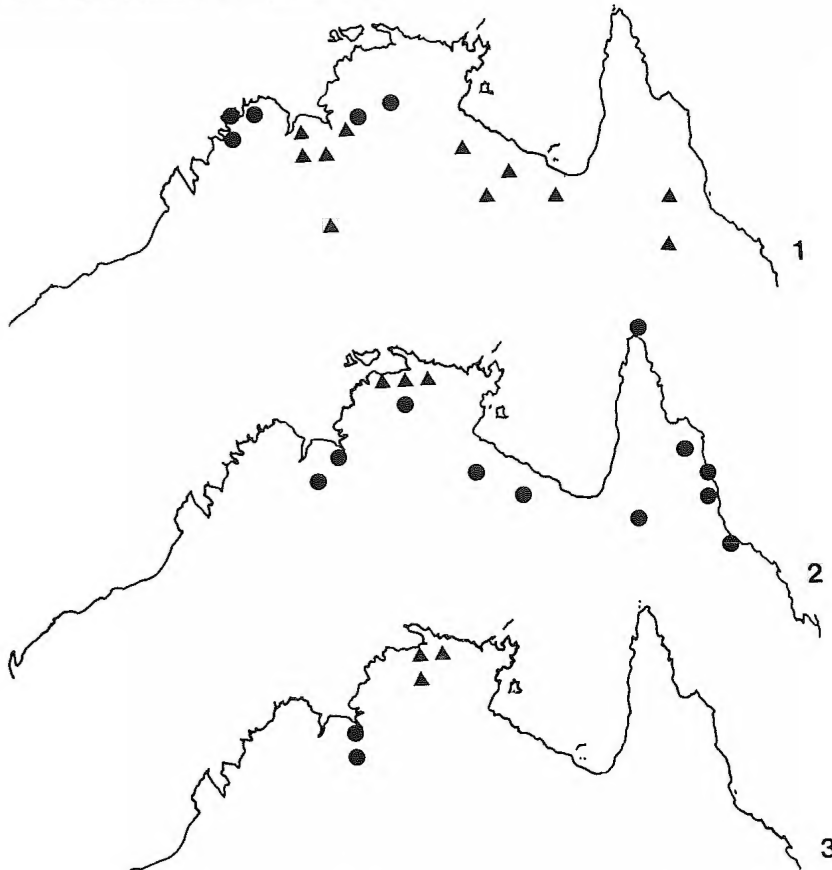
throat with undeveloped stigmatic surfaces. In older flowers the anthers are empty of pollen and the style is exerted from the throat with well developed stigmatic surfaces.

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References

- HIERN, W.P. (1877). Rubiaceae. In Oliver, D., Flora of Tropical Africa 3: 61. London: L. Reeve & Co.
- BRIGGS, J.D. & LEIGH, J.H., (1988). Rare or Threatened Australian Plants. Australian National Parks and Wildlife Service. Special Publication No. 14. Canberra: Australian National Parks and Wildlife Service.
- MERRILL, E.D. & METCALF, F.P. (1942). *Hedyotis* L. versus *Oldenlandia* L. and the status of *H. lancea* Thunb. in relation to *H. consanguinea* Hance. *Journal of the Arnold Arboretum* 23(2): 226-230.
- SCHWARZ, O. (1927). Plantae novae vel minus cognitae Australiae tropicae. *Feddes Repertorium* 24: 80-109.
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Maps 1-3. Distribution of *Hedyotis* spp.: 1. ● *Hedyotis largiflorens*, ▲ *H. argillacea*. 2. ● *H. laceyi*, ▲ *H. leptocaulis*. 3. ● *H. delicata*, ▲ *H. thysanota*.